

Case 2906

Anomalina d'Orbigny, 1826 (Foraminiferida): proposed designation of *A. ariminensis* d'Orbigny in Fornasini, 1902 as the type species

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Abstract. The purpose of this application is to stabilise the usage of the name *Anomalina* d'Orbigny, 1826 (family ANOMALINIDAE Cushman, 1927) for a genus of Cretaceous to Recent benthonic foraminifera of worldwide distribution by the designation of *A. ariminensis* d'Orbigny in Fornasini, 1902 as the type species. At present the nominal species *A. punctulata* d'Orbigny, 1826 is the type but the original material of this taxon has been lost and the species has not been recognised since its first publication. Lack of definition has resulted in the genus becoming heterogeneous through time.

Keywords. Nomenclature; taxonomy; Foraminiferida; ANOMALINIDAE; *Anomalina*; *Anomalina punctulata*; *Anomalina ariminensis*.

1. d'Orbigny (1826, p. 282) described the new genus *Anomalina* and included five new taxa, *A. punctulata*, *A. ariminensis*, *A. elegans*, *A. nautiloides* and *A. orbicularis*. The last four were only names in a list and thus nomina nuda, but *A. punctulata* from l'Île de France (Mauritius) was made available (Article 12b(7) of the Code) by the inclusion of drawings (pl. 15, figs. 1–3) of the taxon. Since *A. punctulata* was the only included species cited by an available name, it is the type of *Anomalina* by monotypy (and not by subsequent designation by Cushman, 1915, as incorrectly stated by Galloway, 1933, p. 287, and many subsequent authors). d'Orbigny's (1826) drawings of *A. punctulata* show a very low trochospire, a partially evolute spiral side and evolute umbilical side, a spiral plug, a small sunken umbilicus, and an interiomarginal aperture which is probably extraumbilical.

2. The names of the other taxonomic species included in *Anomalina* by d'Orbigny (1826) were made available at later dates. d'Orbigny himself (1852) made available *A. nautiloides* by description and Fornasini (1908, pl. 2, figs. 9, 9a) published the drawings from d'Orbigny's 'Planches inédites'; *A. elegans* was made available by Parker, Jones & Brady (1865, p. 25, pl. 2, fig. 73) when they published a drawing based on d'Orbigny's model no. 42; and *A. ariminensis* and *A. orbicularis* were made available by Fornasini (1902, p. 63, fig. 62 and p. 64, fig. 63 respectively) through the publication of drawings from the 'Planches inédites'.

3. Loeblich & Tappan (1964, p. 754) were the first authors to draw attention to the confusion surrounding *Anomalina* as a genus. They attributed this to the fact that the type species *A. punctulata* had not been recognised since its original description, and reported that the type material was missing from the collections of the Muséum National d'Histoire Naturelle, Paris. As a result, the concept of *Anomalina* was

poorly understood, and its relation to the genus *Anomalinoides* Brotzen, 1942 (type species *Anomalina pinguis* Jennings, 1936) was unclear. Nevertheless, Loeblich & Tappan (1964) maintained both genera as distinct, basing their description and diagnosis of *Anomalina* on the original figures of *A. punctulata*.

4. Hansen & Rögl (1980, p. 153) reported that they had made an application to the Commission to seek the suppression of the name *Anomalina* in favour of *Epistomaroides* Uchio, 1952 (type species *Discorbina polystomelloides* Parker & Jones, 1865) on the grounds of what they perceived to be the misidentification of *A. punctulata* by d'Orbigny (1826). Their reasoning was based on the fact that they had recovered specimens from Mauritius with certain similarities to d'Orbigny's drawings of *A. punctulata* but with features identifying them as the species *Epistomaroides punctatus* (Said, 1949, p. 37, pl. 4, fig. 23), originally described from the Red Sea. They pointed out that the status of *Anomalina* had been uncertain since its establishment, and that this uncertainty had led various authors to create a series of genera to cover the wide range of morphologies that had at various times been covered by *Anomalina*. Hansen & Rögl (1980) strengthened Loeblich & Tappan's (1964) claim of the persistent non-recognition of *A. punctulata* by reporting on the numerous failed attempts by a variety of researchers to obtain specimens from the type locality or anywhere else. For the sake of stability Hansen and Rögl made an application to the Commission (April 1979) for the suppression of *Anomalina*.

5. In their reclassification of the Foraminifera, Loeblich & Tappan (1984, p. 51; 1987, p. 604) followed the intentions of Hansen & Rögl's application and replaced the names *Anomalina* and ANOMALINIDAE Cushman, 1927 (p. 92) by *Epistomaroides* and ALFREDINIDAE Singh & Kalia, 1972, thereby pre-empting a decision by the Commission.

6. Hansen & Rögl (in litt., September and December, 1988) withdrew their application before it was published following adverse reactions received by the Commission. Various authors (see Haynes, 1990, pp. 519, 528 and Whittaker, 1988, p. 138) objected to the nomenclature adopted by Loeblich & Tappan (1984, 1987) and retained the use of *Anomalina* and ANOMALINIDAE. Haynes (1990) pointed out that Hansen and Rögl's failure to find specimens of *Anomalina punctulata* from Mauritius and the finding of those of *Epistomaroides punctatus* instead does not, and indeed cannot, prove the inaccuracy of d'Orbigny's (1826) description and drawings of *A. punctulata*. As I have argued (Revets, 1994), d'Orbigny was too conscientious an observer not to notice the presence of morphological features which characterise *Epistomaroides*, particularly since *Epistomaroides* specimens are very large (often exceeding 1000 µm) so that their details were well within the range of resolution of d'Orbigny's microscope.

7. The concept of *Anomalina* cannot be defined through its current type species, *A. punctulata*, because the original material is lost and no other specimens that could be assigned to the species illustrated in the original figures have ever been recovered from the type locality or elsewhere. The lack of type material and the consequent imprecision in the concept of the genus has resulted in the genus becoming more and more heterogeneous. At various times more than 300 species have been included in the genus, many of which have subsequently been reclassified in *Cibicidoides* Thalmann, 1939, *Anomalinoides* Brotzen, 1942 or *Gavelinella* Brotzen, 1942. Uncertainty and, more recently, instability are causing confusion. In order to rectify this

undesirable situation I propose that the type status of *A. punctulata* be set aside and *A. ariminensis* d'Orbigny in Fornasini, 1902 be designated as the type. The Recent holotype of *A. ariminensis* from Rimini (Italy) is in the collections of the Muséum National d'Histoire Naturelle, Paris (catalogue no. F0437) and topotypes are readily available.

8. The characteristics of *Anomalina ariminensis* are sufficiently distinct from the type species of related genera to maintain the genus *Anomalina* separate. *A. ariminensis* most resembles *Nautilus incrassatus* Fichtel & Moll, 1798, a species currently included in *Anomalinoidea* (see BZN 45: 104; June 1988), but differs in having more crescentic chambers, a larger number of chambers in the final whorl, a less clearly separated spiral plug, and wider and more raised sutures (see Revets, 1994, p. 298). I (Revets, 1994) clarified the status of all the taxonomic species originally included by d'Orbigny (1826) in *Anomalina* (see para. 1 above). I recorded that the type specimen of *A. elegans* is badly preserved and that topotypes show the presence of coverplates, a feature that points to a very different familial affiliation. *Anomalina nautiloides* clearly belongs in *Amphistegina* d'Orbigny, 1826. *Anomalina orbicularis* is possibly a junior synonym of *Nautilus asterizans* Fichtel & Moll, 1798 (the type species of *Nonionina* d'Orbigny, 1826) and of *Florilus stellatus* de Montfort, 1808 (the type species of *Florilus* de Montfort, 1808); the names *Nonionina* and *Florilus* became misapplied and were suppressed in Opinion 1568 (March 1990). *Nautilus asterizans* was erroneously assigned by Hansen & Rögl (1980) to *Hanzawaia* Asano, 1944 and is now the type species of *Riminopsis* Revets, 1996 (ref. 1996a); a lectotype was designated by Rögl & Hansen (1984, p. 34, pl. 8, figs. 1-3). The morphology of *A. ariminensis* is closest to that shown in d'Orbigny's drawing of *A. punctulata* and *ariminensis* is thus the most appropriate species for designation as the type species of *Anomalina*.

9. The specific name of *Anomalina ariminensis* d'Orbigny in Fornasini, 1902 (p. 63, fig. 62) was for some time confused with that of *Planulina ariminensis* d'Orbigny, 1826 (p. 280, pl. 14, figs. 1-3). The confusion originated with Brady (1884), who cited *Anomalina* in combination with *ariminensis* but in the sense of *Planulina*. Fornasini (1902, p. 64) carefully distinguished *A. ariminensis* from *P. ariminensis*. The confusion was later compounded by Cushman (1915) who purported to illustrate *A. ariminensis* but used d'Orbigny's (1826) figures of *Planulina ariminensis*. However, from 1928 onwards Cushman used the correct combination of species and drawings. Topotypes of both species show very clearly the major differences between these two taxa.

10. The revision of anomalinid genera (Revets, 1996b) has shown the need to maintain a genus distinct from *Anomalinoidea*, *Cibicoides*, *Hanzawaia*, *Riminopsis* and *Heterolepa* Franzén, 1884. Suppression of the name *Anomalina*, which has been in use for 170 years, would necessitate the creation of a new name for a genus to cover the species which cannot be reassigned to either *Cibicoides* or *Anomalinoidea* (similarly, as a result of the suppression of *Florilus* the creation of the new genus *Riminopsis* Revets, 1996 became necessary). This revision also emphasized the point made earlier by Whittaker (1988) and Haynes (1990) on the need to retain the widely-used family taxon ANOMALINIDAE. The concept of the ANOMALINIDAE is very different from that covered by the ALFREDINIDAE, and suppression would necessitate the establishment of a new family name to cover the concept currently embodied in ANOMALINIDAE.

11. The International Commission on Zoological Nomenclature is accordingly asked:

- (1) to use its plenary powers to set aside all previous fixations of type species for the nominal genus *Anomalina* d'Orbigny, 1826 and to designate *Anomalina ariminensis* d'Orbigny in Fornasini, 1902 as the type species;
- (2) to place on the Official List of Generic Names in Zoology the name *Anomalina* d'Orbigny, 1826 (gender: feminine), type species *Anomalina ariminensis* d'Orbigny in Fornasini, 1902 by the designation in (1) above;
- (3) to place on the Official List of Specific Names in Zoology the name *ariminensis* d'Orbigny in Fornasini, 1902, as published in the binomen *Anomalina ariminensis* (specific name of the type species of *Anomalina* d'Orbigny, 1826).

References

- Brady, H.B. 1884. Report on the Foraminifera dredged by H.M.S. *Challenger* during the years 1873–1876. *Scientific Results of the Voyage of H.M.S. Challenger during the years 1873–1876*, Zoology, vol. 9. 814 pp.
- Brotzen, F. 1942. Die Foraminiferengattung *Gavelinella* nov. gen. und die Systematik der Rotaliiformes. *Sveriges Geologiska Undersökning, Årsbok*, (C)36(8): 1–60.
- Cushman, J.A. 1915. A monograph of the Foraminifera of the North Pacific Ocean. Part 5 (Rotaliidae). *Bulletin of the United States National Museum*, 71: 1–81.
- Cushman, J.A. 1927. An outline of a re-classification of the Foraminifera. *Contributions from the Cushman Laboratory for Foraminiferal Research*, 3(1): 1–105.
- Fornasini, C. 1902. Sinossi metodica dei foraminiferi sin qui rinvenuti nella sabbia del lido di Rimini. *Memorie della Reale Accademia della Scienze dell'Istituto di Bologna, Scienze Naturali*, (5)10: 3–70.
- Fornasini, C. 1908. Illustrazione di specie orbignyane di Nodosardi, di Rotalidi e d'altri foraminiferi. *Memorie della Reale Accademia della Scienze dell'Istituto di Bologna, Scienze Naturali*, 5: 41–54.
- Galloway, J.J. 1933. *A manual of Foraminifera*. xii, 483 pp. Principia Press, Bloomington, Indiana.
- Hansen, H.J. & Rögl, F. 1980. On *Anomalina punctulata* d'Orbigny, 1826. *Journal of Foraminiferal Research*, 10(2): 153–155.
- Haynes, J.R. 1990. The classification of the Foraminifera — a review of historical and philosophical perspectives. *Palaeontology*, 33(3): 503–528.
- Jennings, P.H. 1936. A microfauna from the Monmouth and basal Rancocas Groups of New Jersey. *Bulletins of American Paleontology*, 23(78): 161–232.
- Loeblich, A.R. & Tappan, H. 1964. Sarcodina, chiefly 'Thecamoebians' and Foraminiferida. Pp. 511–900 in Moore, R.C. (Ed.). *Treatise on invertebrate paleontology*, part C, Protista 2, vol. 2, part 2. University of Kansas Press, Kansas.
- Loeblich, A.R. & Tappan, H. 1984. Suprageneric classification of the Foraminiferida (Protozoa). *Micropaleontology*, 30(1): 1–70.
- Loeblich, A.R. & Tappan, H. 1987. *Foraminiferal genera and their classification*. x, 970, viii, 1059 pp. Von Nostrand Reinhold, New York.
- Orbigny, A. d'. 1826. Tableau méthodique de la classe des céphalopodes. *Annales des Sciences Naturelles*, 7: 245–314.
- Orbigny, A. d'. 1852. *Prodrome de paléontologie stratigraphique universelle des animaux mollusques et rayonnés*. 196 pp. Masson, Paris.
- Parker, W.K., Jones, T.R. & Brady, H.B. 1865. On the nomenclature of the Foraminifera. Part 10. The species enumerated by d'Orbigny in the 'Annales des Sciences Naturelles', vol. vii. 1826. *Annals and Magazine of Natural History*, (3)16(91): 15–41.
- Revetz, S.A. 1994. The status of the genus *Anomalina* d'Orbigny, 1826. *Journal of Foraminiferal Research*, 24(4): 296–304.

- Revs, S.A.** 1996a. The generic concept of *Hanzawaia* Asano, 1944 and the new genus *Riminopsis*. *Journal of Foraminiferal Research*, **26**(1): 3–8.
- Revs, S.A.** 1996b. The generic revision of five families of rotaliine Foraminifera. *Cushman Foundation for Foraminiferal Research, Special Publication*, **34**: 1–113.
- Rögl, F. & Hansen, H.J.** 1984. Foraminifera described by Fichtel & Moll in 1798. A revision of *Testacea Microscopica*. *Neue Denkschriften des Naturhistorischen Museums in Wien*, **3**: 1–143.
- Said, R.** 1949. Foraminifera of the northern Red Sea. *Cushman Laboratory for Foraminiferal Research, Special Publication*, **26**: 1–44.
- Uchio, T.** 1952. Foraminiferal assemblages from Hachijo Island, Tokyo Prefecture, with descriptions of some new genera and species. *Japanese Journal of Geology and Geography*, **22**: 145–159.
- Whittaker, J.E.** 1988. *Benthic Cenozoic Foraminifera from Ecuador*. xi, 194 pp. British Museum (Natural History), London.